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February 28, 2007

TO : USPTO

ATTN: EXAMINER J. SEIDLECK

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FROM: Mark J. Henry

RE: 10/528,984

YOUR REFERENCE: 103-1025-US

OUR DOCKET: 1806.1006

NO. OF PAGES (Including this Cover Sheet)

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Mark J. Henry
202-454-1520
202-454-1579

Docket No.: 1806.1006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re the Application of:

Yoshito KURODA, et al.

Serial No. 10/528,984

Group Art Unit: 1711

Confirmation No. 6397

Filed: March 24, 2005

Examiner: James. J. Seidleck

For: GLYCOLIC ACID COPOLYMER AND METHOD FOR PRODUCING THE SAMEDIAGNOSIS
PROGRAMCOMMUNICATION TO THE EXAMINERCommissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed February 22, 2007, enclosed is a copy of an Amendment After Allowance and Declaration, which was filed on June 9, 2006. Also enclosed is a copy of the Patent Office date-stamped postcard. Applicants respectfully request that have not yet received notification that the Amendment has been entered.

As described in the remarks of the Amendment, the changes correct formal matters and do not require substantive examination. Accordingly, it is submitted that the Amendment should be entered even though the Application has been allowed.

Entry of the Amendment After Allowance is respectfully request.

Respectfully submitted,

STAAS & HALSEY LLP

Date: February 28, 2007By: Mark J. HenryMark J. Henry
Registration No. 36,1621201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
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Please Date Stamp and return

Amendment After Allowance Under 37 CFR § 1.312 Declaration

APPLICANT(S): Yoshito KURODA, et al.
SERIAL NO: 10/528,984
CONFIRMATION NO. 6397
TITLE: GLYCOLIC ACID COPOLYMER AND METHOD FOR PRODUCING THE SAME
FILING DATE: March 24, 2005
DOCKET NO: 1806.1006/MJH:nml
DUE DATE: N/A



38

S&H Form: (2/01)

Docket No.: 1806.1006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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FEB 28 2007

In re the Application of:

Yoshito KURODA, et al.

Serial No. 10/528,984

Group Art Unit: 1711

Confirmation No. 6397

Filed: March 24, 2005

Examiner: Acquah, Samuel A.

For: GLYCOLIC ACID COPOLYMER AND METHOD FOR PRODUCING THE
SAMEDIAGNOSIS PROGRAM

AMENDMENT AFTER ALLOWANCE UNDER 37 CFR § 1.312

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

This is in response to the Notice of Allowance mailed April 4, 2006, and having a period for response set to expire on July 4, 2006, the due date for the issue fee payment.

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

FEB 28 2007

Application No.: 10/528,984

IN THE SPECIFICATION:

The specification as amended below with replacement paragraphs shows added text with underlining and deleted text with ~~striketrough~~.

Please amend the paragraph beginning at page 67, line 15 as follows:

--As an amino acid used in the present invention, a C₂-C₂₀ amino acid is preferred. Specific examples of such amino acids include glycine, (+)-alanine, β-alanine, (-)-asparagine, (+)-aspartic acid, (-)-cysteine, (+)-glutamic acid, (+)-glutamine, (-)-hydroxylysine, (-)-leucine, (+)-isoleucine, (+)-lysine, (-)-methionine, (-)-serine, (-)-threonine, (+)-valine, aminolactic aminobutyric acid, azaserine, arginine and methionine.—

Please amend the paragraph beginning at page 68, line 7 as follows:

--As a lactam used in the present invention, a C₂-C₂₀ lactam is preferred. Specific examples of such lactams include glycine anhydride, β-propiolactam, α-pyrrolidone, α-piperidone, ε-caprolactam, α-methyl-caprolactam, ~~α-methyl-caprolactam~~ β-methyl-caprolactam, γ-methyl-caprolactam, δ-methyl-caprolactam, ε-methyl-caprolactam, N-methyl-caprolactam, β,γ-dimethyl-caprolactam, γ-ethyl-caprolactam, γ-isopropyl-caprolactam, ε-isopropyl-caprolactam, γ-butyl-caprolactam, γ-hexacyclobenzyl-caprolactam, ω-enantholactam, ω-capryllactam, caprylolactam, lauro lactam and a dimer of caprolactone.—

Application No.: 10/528,984

Please amend the paragraph beginning at page 123, line 3 as follows:

--20 mg of a glycolic acid copolymer which has been dried at 80 °C under a pressure of 1×10^2 Pa for 6 hours is weighed and, then, dissolved in 3 g of the above-mentioned eluent, followed by filtration using a filter having a mesh size of ± 0.2 μ m, thereby obtaining a sample solution.--

Application No.: 10/528,984

Please amend Table 1 at page 258 as follows:

S&H Form: (2/01)

	Example 1				Example 2				Example 3				Example 4				Example 5			
	123,000				188,000				182,000				167,000				179,000			
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)				83.97				83.97				83.97				88.97			
	Content of glycolic acid monomer units (% by mole)				Lactic acid				Lactic acid				Lactic acid				6-hydroxyhexanoic acid			
	Non-glycolic, hydroxycarboxylic acid monomer units				Type				Type				Type				3-hydroxybutyric acid			
	Content (% by mole)				16.00				11.00				6.00				11.00			
	Average chain length				1.08				1.02				1.02				1.03			
	Content of diglycolic acid monomer units (% by weight [mole])				0.03				0.03				0.03				0.03			
	Polyol monomer units				Type				Type				Type				Type			
	Content (% by mole)				-				-				-				-			
	Polycarboxylic acid monomer units				Type				Type				Type				Type			
	Content (% by mole)				-				-				-				-			
Results of evaluation	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)				0.03				0.03				0.03				0.03			
	Degree of discoloration of copolymer				28				29				29				28			
	Degree of discoloration after the melt heat stability test				36				38				43				39			
	Oxygen gas permeability of the melt-shaped sheet (cc/m ² ·day·atm)				9.1				8.0				7.2				8.0			
	Strength of the melt-shaped sheet				4				5 or more				5 or more				5 or more			
	Biodegradability of the melt-shaped sheet in soil				Biodegradable				Biodegradable				Biodegradable				Biodegradable			

Note: "-" means "not detected".

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Application No.: 10/528,984

Please amend Table 2 at page 259 as follows:

		Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)	109,000	164,000	122,000	187,000
	Content of glycolic acid monomer unit (% by weight mole)	88.86	96.97	72.96	88.97
	Type	Lactic acid	Lactic acid	Lactic acid	Lactic acid
	Non-glycolic, hydroxycarboxylic acid monomer units	11.01	3.00	27.01	11.00
	Content (% by mole)				
	Average chain length	1.02	1.01	1.14	1.62
	Content of diglycolic acid monomer unit (% by mole)	0.13	0.03	0.03	0.03
	Type	-	-	-	-
	Polyol monomer units	-	-	-	-
	Content (% by mole)	-	-	-	-
Results of evaluation	Type	-	-	-	-
	Polycarboxylic acid monomer units	-	-	-	-
	Content (% by mole)	-	-	-	-
	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)	0.13	0.03	0.03	0.03
	Degree of discoloration of copolymer	34	33	33	29
	Degree of discoloration after the melt heat stability test	175	115	39	105
	Oxygen gas permeability of a melt-shaped sheet (cc/m ² -day-atm)	8.2	7.0	35.0	8.4
	Strength of the melt-shaped sheet	4	5 or more	4	5 or more
	Biodegradability of the melt-shaped sheet in soil	Biodegradable	Biodegradable	Biodegradable	Biodegradable

Note: "-" means "not detected".

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Application No.: 10/528,984

Please amend Table 3 at page 260 as follows:

Results of the analysis of the obtained copolymer	Example 6		Example 7		Example 8		Example 9		Example 10	
	187,000		187,000		325,000		330,000		163,000	
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)		88.94		88.98		88.94		88.97	
	Content of glycolic acid monomer units (% by mole)		Lactic acid		Lactic acid		Lactic acid		Lactic acid	
	Non-glycolic, hydroxycarboxylic acid monomer units	Type	10.99		10.98		10.98		10.94	
		Average chain length	1.01		1.01		1.01		1.01	
	Content of diglycolic acid monomer unit (% by mole)		0.03		0.03		0.03		0.04	
	Polyol monomer units	Type	Neopentyl glycol		Trimethylolprop ane		Neopentyl glycol		Trimethylolprop ane	
		Content (% by mole)	0.04		0.01		0.04		0.01	
	Polycarboxylic acid monomer units	Type	-		-		-		-	
		Content (% by mole)	-		-		-		-	
	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)		0.07		0.04		0.08		0.09	
Results of evaluation	Degree of discoloration of copolymer		29		34		33		39	
	Degree of discoloration after the melt melt heat stability test		39		44		44		48	
	Oxygen gas permeability of a melt-shaped sheet (cc/m ² -day-atm)		8.3		8.3		8.6		8.7	
	Strength of the melt-shaped sheet		5 or more		5 or more		5 or more		5 or more	
	Biodegradability of the melt-shaped sheet in soil		Biodegradable		Biodegradable		Biodegradable		Biodegradable	

Note: "-" means "not detected".

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Application No.: 10/528,984

Please amend Table 4 at page 261 as follows:

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	Example 11	Example 12	Example 13	Example 14		Example 15	Comparative Example 5	
				Neopentyl glycol	Trimethylolpropane			
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)							
	Content of glycolic acid monomer unit (% by mole)							
	Non-glycolic, hydroxycarboxylic acid monomer units	Type	Lactic acid	Lactic acid	Lactic acid	Lactic acid	Lactic acid	
		Content (% by mole)	10.86	10.98	9.57	9.56	7.93	4.21
		Average chain length	1.01	1.01	1.05	1.01	1.05	1.02
	Content of diglycolic acid monomer unit (% by mole)							
	Polyol monomer units	Type	Neopentyl glycol	Neopentyl glycol	Neopentyl glycol	Neopentyl glycol	Neopentyl glycol	
		Content (% by mole)	0.04	0.04	0.90	0.01	1.91	0.92
	Polycarboxylic acid monomer units	Type	-	Oxalic acid	Adipic acid	Adipic acid	Adipic acid	Adipic acid
		Content (% by mole)	-	0.01	0.87	0.88	1.88	0.89
Results of evaluation	Total content of Polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)							
	Degree of discoloration of copolymer							
	Degree of discoloration after the melt heat stability test							
	Oxygen gas permeability of a melt-shaped sheet (cc/m ² -day-atm)							
	Strength of the melt-shaped sheet							
Biodegradability of the melt-shaped sheet in soil								

Note: "-" means "not detected".

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Application No.: 10/528,984

Please amend Table 5 at page 262 as follows:

			Example 16	Example 17	Example 18	Example 19	Example 20
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)		178,000	148,000	132,000	152,000	93,000
	Content of glycolic acid monomer unit (% by mole)		88.98	88.93	88.91	88.92	88.98
	Non-glycolic, hydroxycarboxylic acid monomer units	Type	Lactic acid	Lactic acid	Lactic acid	Lactic acid	Lactic acid
		Content (% by mole)	11.00	11.01	11.01	11.01	11.00
		Average chain length	1.02	1.05	1.02	1.02	1.02
	Content of diglycolic acid monomer unit (% by mole)		0.02	0.06	0.08	0.07	0.02
	Polyol monomer units	Type	-	-	-	-	-
		Content (% by mole)	-	-	-	-	-
	Polycarboxylic acid monomer units	Type	-	-	-	-	-
		Content (% by mole)	-	-	-	-	-
Results of evaluation	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)		0.02	0.06	0.08	0.07	0.02
	Degree of discoloration of copolymer		28	28	28	28	27
	Degree of discoloration after the melt heat stability test		39	44	48	48	38
	Oxygen gas permeability of a melt-shaped sheet (cc/m ² ·day·atm)		8.1	8.1	8.0	8.0	8.1
	Strength of the melt-shaped sheet		5 or more	5 or more	5 or more	5 or more	4
	Biodegradability of the melt-shaped sheet in soil		Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable

Note: "-" means "not detected".

Application No.: 10/528,984

Please amend Table 6 at page 263 as follows:

	Weight average molecular weight (Mw)		Comparative Example 6	Comparative Example 7	Comparative Example 8	Comparative Example 9	Comparative Example 10	Comparative Example 11
	Content of glycolic acid monomer unit (% by mole)		186,000	179,000	184,000	109,000	175,000	183,000
Results of the analysis of the obtained copolymer	Non-glycolic, hydroxycarboxylic acid monomer units	Type	Lactic acid	Lactic acid	Lactic acid	Lactic acid	Lactic acid	Lactic acid
		Content (% by mole)	11.00	11.00	11.00	11.02	6.00	17.00
		Average chain length	1.02	1.02	1.02	1.02	2.08	2.36
	Content of diglycolic acid monomer unit (% by mole)		0.20	0.21	0.18	0.14	-	-
	Polyol monomer units	Type	Neopentyl glycol	Neopentyl glycol	Neopentyl glycol	-	-	-
		Content (% by mole)	0.21	0.21	0.20	-	-	-
	Polycarboxylic acid monomer units	Type	-	-	-	-	-	-
		Content (% by mole)	-	-	-	-	-	-
	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)		0.41	0.42	0.38	0.14	-	-
	Degree of discoloration of copolymer		40	39	37	38	30	29
Results of evaluation	Degree of discoloration after the melt heat stability test		224	242	193	158	92	58
	Oxygen gas permeability of a melt-shaped sheet (cm ² -day-atm)		8.7	8.8	8.8	8.3	8.8	28.0
	Strength of the melt-shaped sheet		5 or more	5 or more	6 or more	4	5 or more	5 or more
	Biodegradability of the melt-shaped sheet in soil		Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable

Note: "-" means "not detected".

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Application No.: 10/528,984

REMARKS

Amendments to page 67, line 22, page 68, line 11 and page 123, line 7 are merely corrections of inadvertent errors which occurred at the time of the translation into English of the original Japanese PCT specification. Amendments to page 258, Table 1 and page 259, Table 2 (i.e., the amendments to change "% by weight" to "% by mole") are also merely corrections of inadvertent errors which occurred at the time of the translation into English of the original Japanese PCT specification.

In support of the above-mentioned amendments, the Applicant attaches hereto a DECLARATION to verify that the amendments are made only to correct inadvertent errors which occurred at the time of the translation into English of the original Japanese PCT specification.

Amendments to page 260, Table 3, page 261, Table 4, page 262, Table 5 and page 263, Table 6 are merely corrections of apparent clerical errors. Support for these amendments (to change "meld" to "melt") is found, for example, at page 258, Table 1 (after "Degree of discoloration after the") of the present specification.

In accordance with the above, it is submitted that the foregoing changes should not require further substantive consideration by the Examiner. Accordingly, entry at this after-final stage of prosecution is fully appropriate. The Examiner is requested to issue a Supplemental Notice of Allowably to confirm that the changes have been entered. Because the application has been allowed, this matter is somewhat urgent.

Finally, if there are any formal matters remaining after this Amendment, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date:

July 9 2006

By:

Mark J. HenryMark J. Henry
Registration No. 36,162

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

DECLARATION

I, Kenji KABUKI, c/o the Inoue & Associates of 3rd Floor, Akasaka Habitation Building, 3-5, Akasaka 1-chome, Minato-ku, Tokyo, Japan do solemnly and sincerely declare that I am conversant with the Japanese and English languages and that I believe:

that the description "aminolactic acid" at page 67, line 22 of the English specification should be amended to

--aminobutyric acid--;

that the description " α -methyl-caprolactam" at page 68, line 11 of the English specification should be amended to

-- β -methyl-caprolactam--;

that the description "2" at page 123, line 7 of the English specification should be amended to --0.2--;

that the description "% by weight" at page 258, Table 1 (after "Content of diglycolic acid monomer units") of the English specification should be amended to --% by mole--; and

that the description "% by weight" at page 259, Table 2 (after "Content of glycolic acid monomer unit") of the English specification should be amended to --% by mole--.

These amendments are merely corrections of inadvertent errors which occurred at the time of the translation into

English of the original PCT specification. The attached copies of revised pages 67, 68, 123, 258 and 259 of the English specification are true and correct translations of the corresponding pages of the international patent application No. PCT/JP03/12165. The English description "aminobutyric acid" in the English specification at page 67, line 22 is a correct English translation of the Japanese description "アミノ酪酸" in the original Japanese PCT specification at page 57, line 8. The English description " β -methyl-caprolactam" in the English specification at page 68, line 11 is a correct English translation of the Japanese description " β -メチルーカプロラクタム" in the original Japanese PCT specification at page 57, line 21. The English description "0.2" in the English specification at page 123, line 7 is a correct English translation of the Japanese description "0. 2" in the original Japanese PCT specification at page 95, lines 7 to 8. The English description "% by mole" in the English specification at page 258, Table 1 (after "Content of diglycolic acid monomer units") is a correct English translation of the Japanese description "モル%" in the original Japanese PCT specification at page 179, Table 1 (after "ジグリコール酸単位含有率"). The English description "% by mole" in the English specification at page 259, Table 2 (after "Content of glycolic acid monomer unit") is a

correct English translation of the Japanese description "モ
ル%" in the original Japanese PCT specification at page 180,
Table 2 (after "グリコール酸単位含有率").

I declare that all statements made herein of my own
knowledge are true and that all statements made on informa-
tion and belief are believed to be true; and further that
these statements were made with the knowledge that willful
false statements and the like so made are punishable by fine
or imprisonment, or both, under Section 1001 of Title 18 of
the United States Code and that such willful false statements
may jeopardize the validity of the application or any patent
issuing thereon.

March 29, 2005
(Date)

Kenji Kabuki
Kenji KABUKI

lected from the group consisting of aliphatic dicarboxylic acids, such as oxalic acid, malonic acid, glutaric acid, succinic acid, adipic acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, undecanedicarboxylic acid, dodecanedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid, and a derivative thereof; and aliphatic tricarboxylic acids, such as propanetricarboxylic acid, trimellitic acid, pyromellitic acid and 1,3,6-hexanetricarboxylic acid, and a derivative thereof.

In addition, other compounds, such as an amino acid, a polyamine and a lactam, may be used as a comonomer in an amount which does not adversely affect the properties of the present invention.

As an amino acid used in the present invention, a C₂-C₂₀ amino acid is preferred. Specific examples of such amino acids include glycine, (+)-alanine, β-alanine, (-)-asparagine, (+)-aspartic acid, (-)-cysteine, (+)-glutamic acid, (+)-glutamine, (-)-hydroxylysine, (-)-leucine, (+)-isoleucine, (+)-lysine, (-)-methionine, (-)-serine, (-)-threonine, (+)-valine, aminobutyric acid, azaserine, arginine and methionine.

As a polyamine used in the present invention, a C₁-C₂₀ polyamine is preferred. Specific examples of

such polyamines include methylhydrazine, monomethylenediamine, dimethylenediamine, trimethylenediamine, tetramethylenediamine, pentamethylenediamine, hexamethylenediamine, heptamethylenediamine, octamethylenediamine, nonamethylenediamine, decamethylenediamine, undecamethylenediamine and dodecamethylenediamine.

As a lactam used in the present invention, a C_2 - C_{20} lactam is preferred. Specific examples of such lactams include glycine anhydride, β -propiolactam, α -pyrrolidone, α -piperidone, ϵ -caprolactam, α -methyl-caprolactam, β -methyl-caprolactam, γ -methyl-caprolactam, δ -methyl-caprolactam, ϵ -methyl-caprolactam, N-methyl-caprolactam, β,γ -dimethyl-caprolactam, γ -ethyl-caprolactam, γ -isopropyl-caprolactam, ϵ -isopropyl-caprolactam, γ -butyl-caprolactam, γ -hexacyclobenzyl-caprolactam, ω -enanthalactam, ω -capryllactam, caprylolactam, laurilactam and a dimer of caprolactone.

Among the above-mentioned compounds, when a compound has an asymmetric carbon atom and the compound exists in a D-form, an L-form or a mixture of D- and L-forms, any one of these forms may be used.

With respect to the forms of the raw materials used (i.e., glycolic acid, a derivative of glycolic acid, and a compound copolymerizable with glycolic acid and/or derivative of glycolic acid), there is no par-

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hexafluoroisopropanol to prepare a solution (hereinafter referred to simply as "eluent").

20 mg of a glycolic acid copolymer which has been dried at 80 °C under a pressure of 1×10^2 Pa for 6
5 hours is weighed and, then, dissolved in 3 g of the above-mentioned eluent, followed by filtration using a filter having a mesh size of 0.2 μ m, thereby obtaining a sample solution.

With respect to the sample solution, GPC is performed under conditions wherein the column temperature
10 is 40 °C and the flow rate of the eluent is 1 ml/minute. In the GPC, the sample solution is flowed through three different columns (TskguardcolumnHHR-H (tradename) as a guard column; and Tskgel (tradename) G5000HHR and
15 Tskgel (tradename) G3000HHR, each of which is manufactured and sold by TOSOH Corporation, Japan) which are connected in series. A calibration curve is obtained in advance from the elution times of standard monodisperse polymethyl methacrylate samples (which, respectively, have known weight average molecular weights of
20 1,577,000, 685,000, 333,000, 100,250, 62,600, 24,300, 12,700, 4,700, 1,680 and 1,140) (manufactured and sold by Polymer Laboratories Ltd, U.K.) and a methyl methacrylate monomer (molecular weight: 100). which
25 elution times are determined by an RI detector. The

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Table 1

		Example 1	Example 2	Example 3	Example 4	Example 5
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)	123,000	186,000	182,000	167,000	179,000
	Content of glycolic acid monomer units (% by mole)	83.97	88.97	93.97	88.97	88.97
	Non-glycolic, hydroxycarboxylic acid monomer units	Lactic acid	Lactic acid	Lactic acid	6-hydroxyhexanoic acid	3-hydroxybutyric acid
		Content (% by mole)	11.00	6.00	11.00	11.00
	Average chain length	1.08	1.02	1.02	1.03	1.02
	Content of diglycolic acid monomer units (% by mole)	0.03	0.03	0.03	0.03	0.03
	Polyol monomer units	Type	-	-	-	-
		Content (% by mole)	-	-	-	-
	Polycarboxylic acid monomer units	Type	-	-	-	-
		Content (% by mole)	-	-	-	-
Results of evaluation	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)	0.03	0.03	0.03	0.03	0.03
	Degree of discoloration of copolymer	28	29	29	29	28
	Degree of discoloration after the melt heat stability test	36	38	43	38	39
	Oxygen gas permeability of the melt-shaped sheet [cc/m ² ·day·atm]	9.1	8.0	7.2	8.1	8.0
	Strength of the melt-shaped sheet	4	5 or more	5 or more	5 or more	5 or more
	Biodegradability of the melt-shaped sheet in soil	Biodegradable	Biodegradable	Biodegradable	Biodegradable	Biodegradable

Note: "-" means "not detected".

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Table 2

		Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4
Results of the analysis of the obtained copolymer	Weight average molecular weight (Mw)	109,000	164,000	122,000	187,000
	Content of glycolic acid monomer unit (% by mole)	88.86	96.97	72.96	88.97
	Type	Lactic acid	Lactic acid	Lactic acid	Lactic acid
	Non-glycolic, hydroxycarboxylic acid monomer units				
	Content (% by mole)	11.01	3.00	27.01	11.00
	Average chain length	1.02	1.01	1.14	1.62
	Content of diglycolic acid monomer unit (% by mole)	0.13	0.03	0.03	0.03
	Type	-	-	-	-
	Polyol monomer units	-	-	-	-
	Content (% by mole)	-	-	-	-
Results of evaluation	Type	-	-	-	-
	Polycarboxylic acid monomer units	-	-	-	-
	Content (% by mole)	-	-	-	-
	Total content of polycarboxylic acid monomer units including polyol monomer units and diglycolic acid monomer units (% by mole)	0.13	0.03	0.03	0.03
	Degree of discoloration of copolymer	34	33	33	29
	Degree of discoloration after the melt heat stability test	175	115	39	105
	Oxygen gas permeability of a melt-shaped sheet (cc/m ² ·day·atm)	8.2	7.0	35.0	8.4
	Strength of the melt-shaped sheet	4	5 or more	4	5 or more
	Biodegradability of the melt-shaped sheet in soil	Biodegradable	Biodegradable	Biodegradable	Biodegradable

Note: "-" means "not detected".

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アミノ酸としては、炭素数 2 ~ 20 のアミノ酸が好ましい。
アミノ酸として、例えば、グリシン、(+)-アラニン、 β -アラニン、(-)-アスパラギン、(+)-アスパラギン酸、(-)-システイン、(+)-グルタミンサン、(+)-グルタミン、(-)-ヒドロキシリシン、(-)-ロイシン、(+)-イソロイシン、(+)-リシン、(-)-メチオニン、(-)-セリン、(-)-トレオニン、(+)-バリン、アミノ酪酸、アザセリン、アルギニン、エチオニン等が挙げられる。

多価アミンとしては、炭素数 1 ~ 20 の多価アミンが好ましい。アミンとして、例えば、メチルヒドラジン、モノメチレンジアミン、ジメチレンジアミン、トリメチレンジアミン、テトラメチレンジアミン、ペンタメチレンジアミン、ヘキサメチレンジアミン、ヘプタメチレンジアミン、オクタメチレンジアミン、ノナメチレンジアミン、デカメチレンジアミン、ウンデカメチレンジアミン、ドデカメチレンジアミン等が挙げられる。

ラクタムとしては、炭素数 2 ~ 20 のラクタムが好ましい。ラクタムの具体例として、グリシン無水物、プロパンラクタム、 α -ピロリドン、 α -ピペリドン、 ϵ -カプロラクタム、 α -メチル-カプロラクタム、 β -メチル-カプロラクタム、 γ -メチル-カプロラクタム、 δ -メチル-カプロラクタム、 ϵ -メチル-カプロラクタム、N-メチル-カプロラクタム、

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ルオロイソプロパノールを調製しておく。具体的には、ヘキサフルオロイソプロパノール1000gに対して、トリフルオロ酢酸ナトリウム6.48gを溶解して溶液（以下、「溶離液」と略記する）を調製する。

評価用グリコール酸共重合体の試料溶液としては、80℃、 1×10^2 Paで6時間乾燥したグリコール酸共重合体20mgを精秤した後、前記溶離液3gに溶解し、その後、0.2μmのフィルターにて濾過したものを用いる。

カラム温度40℃にて、溶離液を流量1ml/分の条件下でカラム（カラム構成は、ガードカラムとして日本国東ソー（株）社製Tskguardcolumn HHR-H（登録商標）を用い、日本国東ソー（株）製Tskgel（登録商標）G5000 HHR、及び日本国東ソー（株）製Tskgel（登録商標）G3000 HHRの各1本ずつを直列に配置）を通し、分子量1,577,000、685,000、333,000、100,250、62,600、24,300、12,700、4,700、1,680、1140の、分子量既知の英国Polymer Laboratories社製単分散ポリメタクリル酸メチル標準物質、及びメタクリル酸メチルモノマー（分子量100）のRI検出による溶出時間から求めた検量線を予め作成し、その溶出時間から重量平均分子量を算出する。

（4）グリコール酸共重合体の融点

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表 1

得られた 共重合体 の分析値	実施例1		実施例2		実施例3		実施例4		実施例5	
	重量平均分子量(Mw)		123,000	186,000	182,000		167,000		179,000	
評価値	グリコール酸単位含有率(モル%)		83.97	88.97	93.97		88.97		88.97	
	種類		乳酸	乳酸	乳酸		6-ヒドロキシヘキサノイック アシッド		3-ヒドロキシブチリクアシッド	
	グリコール酸単位以外の ヒドロキシカル ボン酸単位		16.00	11.00	6.00		11.00		11.00	
	含有率(モル%)									
	平均連鎖長		1.08	1.02	1.02		1.03		1.02	
得られた 共重合体 の分析値	ジグリコール酸単位含有率(モル%)		0.03	0.03	0.03		0.03		0.03	
	種類		—	—	—		—		—	
	ポリオール単位		—	—	—		—		—	
	含有率(モル%)		—	—	—		—		—	
	種類		—	—	—		—		—	
	ポリカルボン酸 単位		—	—	—		—		—	
	含有率(モル%)		—	—	—		—		—	
	ポリオール単位とジグリコール酸単位 を含めたポリカルボン酸単位の含有 率の総和(モル%)		0.03	0.03	0.03		0.03		0.03	
	樹脂の着色度		28	29	29		29		28	
	溶融熱安定性評価後の着色度		36	38	43		38		39	
評価値	溶融成形シートの酸素ガス透過度 (cc/m ² ·day·atm)		9.1	8.0	7.2		8.1		8.0	
	溶融成形シートの強度		4	5以上	5以上		5以上		5以上	
	溶融成形シートの中崩壊性		有り	有り	有り		有り		有り	

—印:検出されないことを示す。

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表 2

		比較例1	比較例2	比較例3	比較例4
得られた 共重合体 の分析値	重量平均分子量(Mw)	109,000	164,000	122,000	187,000
	グリコール酸単位含有率(モル%)	88.86	96.97	72.96	88.97
	種類	乳酸	乳酸	乳酸	乳酸
	含有率(モル%)	11.01	3.00	27.01	11.00
	平均連鎖長	1.02	1.01	1.14	1.62
	ジグリコール酸単位含有率(モル%)	0.13	0.03	0.03	0.03
	種類	—	—	—	—
	含有率(モル%)	—	—	—	—
	種類	—	—	—	—
	含有率(モル%)	—	—	—	—
評価値	ポリオール単位とジグリコール酸単位を含めたポリカルボン酸単位の含有率の総和(モル%)	0.13	0.03	0.03	0.03
	樹脂の着色度	34	33	33	29
	溶融熱安定性評価後の着色度	175	115	39	105
	溶融成形シートの酸素ガス透過度(cc/m ² ·day·atm)	8.2	7.0	35.0	8.4
	溶融成形シートの強度	4	5以上	4	5以上
溶融成形シートの土中崩壊性	有り	有り	有り	有り	

一印:検出されないことを示す。